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Success Story

PHYSICIST EARNS AMERICAN PHYSICAL SOCIETY OUTSTANDING ACHIEVEMENT MEDAL



The American Physical Society's (APS) Division of Polymer Physics presented Dr. Timothy J. Bunning the 2001 John H. Dillon Medal for contributions to science and national security. The award also highlights the talent, dedication, and professionalism of the men and women of the Materials and Manufacturing Directorate.



Air Force Research Laboratory
Wright-Patterson AFB OH

Materials and Manufacturing
Awards and Recognition

Achievement

The 40,000-member APS recognized Dr. Bunning, a polymer physicist in the directorate's Hardened Materials Branch, for helping advance materials research that benefits the warfighter, supports the development of new commercial products, and influences the study of physics. The APS awards the Dillon Medal each year to an individual within 10 years after earning a doctorate degree. The award recognizes outstanding research by polymer physicists who show exceptional promise early in their careers.

Background

The APS credited Dr. Bunning with significant contributions in a variety of polymer-based optical materials areas including polymer-dispersed liquid crystals, polymeric side-chain liquid crystals, laser-resistant polymers, and active and passive polymer photonic structures. Dr. Bunning's research increased the understanding of the highly complex nature of nanoscale structure development in holographic polymer dispersed liquid crystals—polymer-based optical elements with broad-based photonic applications in a number of topical areas including display and telecommunications technology.

Before photonics became an area of opportunity, Dr. Bunning and his colleagues successfully demonstrated a one-step fabrication of electrically switchable reflection and transmission holograms using holographic photopolymerization. Working with research associates, Dr. Bunning helped unravel the complex, dynamic balance between polymerization kinetics, diffusion, and phase separation using high-resolution electron microscopy techniques, and real-time X-ray and light scattering measurements. Over the last few years, Dr. Bunning made significant contributions toward the development of comprehensive structure/property relationships for this relatively new class of materials.

Dr. Bunning's work facilitated the progression of this technology from laboratory research to intellectual property (10 patents issued/pending), to commercial implementation. Recently, Dr. Bunning extended this holographic photopolymerization technique to two photon curing systems—the templating of nanoparticles in a one-step, large area process and fabrication of three-dimensional, photonic crystals with varied optical properties.

Dr. Bunning is a recipient of the 2001 Federal Laboratory Consortium Award for Excellence in Technology Transfer. In addition to APS, Dr. Bunning holds memberships in the American Chemical Society and the Materials Research Society.

Additional information

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